Earth Science Data and Information System (ESDIS) Project Level 2 Requirements Other ESDIS Project Requirements

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Abstract

This is a companion document to the ESDIS Project Level 2 Requirements Volume 0: Overall ESDIS Project Requirements. This document presents the requirements for the Earth Observing System Data and Information System (EOSDIS) Test System (ETS). | CH02

Keywords: ETS, EDOS, ECS, EBnet, Operations Management Data, PDS, forward link data, return-link data, expedited data sets, production data sets. | CH01

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Section 1. Introduction

1.1 Scope

This document presents the Level 2 requirements for the Earth Oberving System Data and Information System (EOSDIS) Test System (ETS). This document is a companion to the Earth Science Data and Information System (ESDIS) Project Level 2 Requirements Volume 0: Overall ESDIS Project Requirements (to be referred as "Level 2 Volume 0"). Level 2 Volume 0 provides necessary information for understanding the Mission to Planet Earth, the context of the ETS, and the requirements hierarchy.

CH02

Figure 1-1. EOS Ground System Final Architecture - Deleted

Section 2. Other ESDIS Project Key Functional Objectives

2.1 ETS Key Functional Objectives

Key functional objectives of ETS are:

- Generate input and output products that interface with one or more EOSDIS elements.

- Provide for appropriate data flow (i.e., ETS transmission and reception) for these products among EOSDIS elements in a given test.

- Provide sufficient summary quality and accounting statistics on data transmitted and received for test teams to assess performance of the element under test and to determine correctness and completeness of the element's generated data products.

2.2 Reserved For Future

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Section 3. ETS Requirements

3.1 ETS Requirements

This section contains the requirements for the ETS overall system and the ETS functions.

3.1.1 ETS System-Level Requirements

This subsection contains the overall system-level requirements for ETS.

3.1.1.1.	ETS shall conform to the CCSDS Recommendations for Space Data System Standards applicable to the ESDIS Project as specified in this document.	233001
3.1.1.2.	ETS shall provide the capability to accept and distribute test data by electronic transmission.	233002
3.1.1.3.	ETS shall provide an approriate level of security to meet minimal requirements for NASCOM and EOSDIS Ground System.	233003
3.1.1.4.	ETS shall provide the capability to generate flags in all headers.	233004
3.1.1.5.	ETS shall provide the capability to read and interpret flags in all headers.	233005
3.1.1.6.	ETS shall provide the capability to validate all headers of received data.	233006
3.1.1.7.	ETS shall provide the capability to generate static test data, dynamic test data, or a combination of both.	233007
3.1.1.8.	ETS shall provide the capability to generate CCSDS test data with predefined errors in selected header and data fields.	233008
3.1.1.9.	ETS shall provide the capability to create time/data gaps in the ETS-generated test data.	233009
3.1.1.10.	ETS shall provide the capability to insert fill data into ETS-generated test data.	233010
3.1.1.11.	ETS shall provide the capability to monitor and display ETS system configuration and test status.	233011
3.1.1.12.	ETS shall be capable of providing dumps of received or generated test data on electronic and physical media.	233012
3.1.1.13.	ETS shall provide the capability to generate unique APIDs or VCDU identifiers (VCDU-IDs) for a testing session.	233013
3.1.1.14.	ETS shall use the universal time coordinated (UTC) format for time-of-day-related data, as required by the test.	233014

3.1.1.15.   ETS shall provide the capability to log operator dialog to maintain an 233015
operations audit trail, as specified in the test script.

3.1.1.16.   ETS shall provide tools to support data analysis. 233016

3.1.1.17.   ETS shall provide the capability to receive, store, and utilize the AM-1 233017
spacecraft database.

3.1.1.18.   ETS shall provide the capability to insert errors into data from 233018
spacecraft- and instrument-generated tapes.

3.1.1.19.   ETS shall provide the capability to generate production data sets 233019
(PDSs) and expedited data sets (EDSs) from spacecraft- and
instrument-generated tapes.

3.1.1.20.   ETS shall provide the capability to generate and transmit OMD through 233020
EBnet.

3.1.1.21.   ETS shall provide the capability to receive OMD through EBnet. 233021

3.1.1.22.   ETS shall provide the capability to store transmitted and received test 233022
data, as directed by operator control.

3.1.2 ETS Simulating High-Rate TGT Return-Link Requirements

This subsection contains the requirements for ETS providing the high-rate TGT return-link during tests.

3.1.2.1.   ETS shall provide the capability to generate and transmit a TGT high- 233023
rate return-link in the form of channel access data units (CADUs).

3.1.2.2.   ETS shall provide the capability to generate and transmit the TGT 233024
return-link clock.

3.1.3 ETS Simulating EDOS Output Requirements

This subsection contains the requirements for ETS acting as the EDOS during tests.

3.1.3.1.   ETS shall provide the capability to generate and transmit PDSs using 233025
ETS-generated test data.

3.1.3.2.   ETS shall provide the capability to generate and transmit EDSs using 233026
ETS-generated test data.

3.1.3.3.   ETS shall provide the capability to generate the summary status, 233027
quality, and accounting data reporting of EDOS services for processing
of ETS-generated data.

3.1.4 ETS Simulating DAAC Front-End Requirements

This subsection contains the requirements for ETS acting as a DAAC during tests.

3.1.4.1.	ETS shall provide the capability to receive PDSs.	233028
3.1.4.2.	ETS shall provide the capability to receive EDSs.	233029
3.1.4.3.	ETS shall provide the capability to store received PDSs and EDSs.	233030

3.1.5 ETS Spacecraft Simulation Requirements for TGT and Contingency-Mode Operations

This subsection contains the requirements for ETS acting in one of two modes:

- As the spacecraft and a ground station (TGT, AGS, SGS or WOTS)   CH01

- As the spacecraft, a ground station, and EDOS

3.1.5.1.	ETS shall provide the capability to simulate EOS AM-1 low-rate spacecraft return-link data.	233031	
3.1.5.2.	ETS shall provide the capability to generate simulated time codes in the packet headers.	233032	
3.1.5.3.	ETS shall provide the capability to generate user-specified VCDU packet data values.	233033	
3.1.5.4.	ETS shall provide the capability to receive EOS spacecraft command bit stream.	233034	
3.1.5.5.	ETS shall provide the capability to verify the received EOS spacecraft commands by updating the command link control word (CLCW) based on the receipt of a valid command.	233035	
3.1.5.6.	ETS shall provide the capability to transmit the CLCW in the form of EDOS data units (EDUs) to EOC through EBnet.	233036	
3.1.5.7.	ETS shall provide the capability to perform the Command Operations Procedures (COP-1) protocol for commands over the low-rate return-link.	233037	
3.1.5.8.	ETS shall provide the capability to respond to a limited number of EOS spacecraft commands.	233038	
3.1.5.9.	ETS shall provide the capability to generate the AGS return-link CADUs.	233039	CH01
3.1.5.10.	ETS shall provide the capability to receive AGS command bit streams.	233040	CH01

3.1.5.11.	ETS shall provide the capability to generate the SGS return-link CADUs.	233041	CH01
3.1.5.12.	ETS shall provide the capability to receive SGS command bit streams.	233042	CH01
3.1.5.13.	ETS shall provide the capability to generate the WOTS return-link CADUs.	233043	CH01
3.1.5.14.	ETS shall provide the capability to receive WOTS command bit streams.	233044	CH01
3.1.5.15.	ETS shall provide the capability to simulate rate-buffered data files using ETS-generated test data.	233045	
3.1.5.16.	ETS shall provide the capability to receive spacecraft commands in the form of commands from EOC through EBnet.	233046	
3.1.5.17.	ETS shall provide the capability of transmitting telemetry in the form of EDUs through EBnet.	233047	
3.1.5.18.	ETS shall provide the capability of setting telemetry end-item verifiers on receipt of valid commands, if defined in the EOS AM-1 Project spacecraft database and incorporated into the ETS database.	233048	
3.1.5.19.	ETS shall provide the capability to set telemetry header and data fields.	233049	
3.1.5.20.	ETS shall provide the operator the real-time capability of enabling/disabling any element of the command validation process, entering spacecraft commands, controlling transmission of telemetry, and inducing a limited number of telemetry errors.	233050	
3.1.5.21.	ETS shall provide a transportable spacecraft simulation capability.	233051	

3.1.6 ETS Requirements for Spacecraft Interface With EOC

This subsection contains requirements for ETS acting as EDOS for both the forward-link and low-rate return-link interfaces with the EOC.

3.1.6.1.	ETS shall provide the capability to receive low-rate spacecraft data.	233052
3.1.6.2.	ETS shall provide the capability to perform Reed-Solomon decoding on received low-rate spacecraft data.	233053
3.1.6.3.	ETS shall provide the capability to construct packets from the received low-rate return-link data and transmit the data in the form of EDUs to the EOC.	233054
3.1.6.4.	ETS shall provide the capability to extract CLCWs from the received low-rate return-link data and transmit the data in the form of EDUs to the EOC.	233055

3.1.6.5.   ETS shall provide the capability to receive command data blocks from   233056
             the EOC and transmit these as command bit streams.

3.1.6.6.   ETS shall provide the capability to verify the data and protocol formats   233057
             of received low-rate forward- and return-link data for communications
             interface checks.

3.1.6.7.   ETS shall provide the capability to provide quality and accounting data   233058
             for received low-rate forward- and return-link data.

3.2 ETS Performance Requirements

3.2.1. ETS System-Level Performance Requirements

This subsection contains the ETS system-level performance requirements.

3.2.1.1.   ETS hardware that is configured for actual testing shall have a mean-   233059
             time-to-failure greater than 396 hours.

3.2.1.2.   ETS hardware that is configured for actual testing shall have an   233060
             availability greater than 0.98.

3.2.1.3.   ETS shall provide the capability to generate and transmit up to 512   233061
             unique APIDs.

3.2.1.4.   ETS shall provide the capability to generate and transmit up to 31   233062
             unique VCDU-IDs.

3.2.1.5.   ETS shall provide the capability to issue system configuration and test   233063
             status reports on a periodic basis, in selectable multiples of 1 minute.

3.2.1.6.   ETS shall update status, data quality, and accounting information once   233064
             every 10 seconds, at a minimum.

3.2.1.7.   ETS shall acknowledge a request from a local user within 2 seconds of   233065
             its entry.

3.2.1.8.   ETS shall start the execution of a local user request within 5 seconds of   233066
             its entry.

3.2.1.9.   ETS shall be ready for operational use within 20 minutes of power on.   233067

3.2.1.10.   ETS shall provide the capability to store 20 minutes of high-rate test   233068
             data during a testing session.

3.2.1.11.   ETS shall provide the capability to store low-rate data during a testing   233069
             session up to 16 megabytes (MB).

3.2.2 ETS Performance Requirements for Simulating High-Rate TGT Return-link

This subsection contains the performance requirements for ETS acting as the TGT during tests.

3.2.2.1.   ETS shall provide the capability to generate and transmit up to two   233070
TGT return-link data streams, including clock, each in the form of
CADUs each at rates up to 150 megabits per second (Mbps).

3.2.3 ETS Performance Requirements for Simulating EDOS Output

3.2.3.1.   ETS shall provide the capability to generate and transmit PDSs to a   233071
single destination at a rate up to 34 Mbps.

3.2.3.2.   ETS shall provide the capability to generate and transmit EDSs to a   233072
single destination at a rate up to 34 Mbps

3.2.3.3.   ETS shall provide the capability to generate and transmit a data set that   233073
spans multiple TDRSS sessions.

3.2.4 ETS Performance Requirements for Simulating DAAC Front End

This subsection contains the performance requirements for ETS acting as a DAAC during tests.

3.2.4.1.   ETS shall provide the capability to receive PDSs from a single source   233074
at rates up to 34 Mbps.

3.2.4.2.   ETS shall provide the capability to receive EDSs from a single source   233075
at rates up to 34 Mbps.

3.2.5 ETS Performance Requirements for Simulating TGT and Contingency Mode

This subsection contains performance requirements for ETS acting in one of two modes:

- As the spacecraft and a ground station (TGT, AGS, SGS or WOTS)   CH01

- As the spacecraft, a ground station, and EDOS

3.2.5.1.   ETS shall provide the capability to generate and transmit CADUs at a   233077
rate up to 256 kbps.

3.2.5.2.   ETS shall provide the capability to receive command bit streams at a   233078
rate up to 10 kbps.

3.2.5.3.	ETS shall provide the capability to generate and transmit the AGS return-link data at rates up to 512 kbps.	233079	CH01
3.2.5.4.	ETS shall provide the capability to receive AGS forward-link data at 2 kbps.	233080	CH01
3.2.5.5.	ETS shall provide the capability to generate and transmit the SGS return-link data at rates up to 512 kbps.	233081	CH01
3.2.5.6.	ETS shall provide the capability to receive SGS forward-link data at 2 kbps.	233082	CH01
3.2.5.7.	ETS shall provide the capability to generate and transmit the WOTS return-link data at rates up to 512 kbps.	233083	CH01
3.2.5.8.	ETS shall provide the capability to receive WOTS forward-link data at 2 kbps.	233084	CH01
3.2.5.9.	ETS shall provide the capability to multiplex up to 31 VCDU-IDs for one spacecraft identifier (SCID) in the same return-link physical channel.	233085	
3.2.5.10.	ETS shall be capable of generating two simultaneous low-rate S-band data streams, of which the maximum rate for one is 16 kbps and the other is 512 kbps.	233086	
3.2.5.11.	ETS shall provide the capability to generate and transmit a rate-buffered data file at rates up to 1.1 Mbps.	233087	
3.2.5.12.	ETS shall provide the capability to generate and transmit up to two streams of telemetry in the form of EDUs at rates up to 16 kbps.	233088	
3.2.5.13.	ETS shall provide the capability to transmit CLCWs as EDUs at rates up to 1 kbps.	233089	
3.2.5.14.	ETS shall provide the capability to receive commands from EOC at rates up to 10 kbps.	233090	

3.2.6 ETS Performance Requirements for Spacecraft Interface With EOC

This subsection contains performance requirements for ETS acting as EDOS for both the forward-link and the low-rate return-link interfaces with the EOC.

3.2.6.1.	ETS shall provide the capability to perform frame synchronization on received spacecraft data at rates up to 512 kbps.	233091
3.2.6.2.	ETS shall provide the capability to perform Reed-Solomon decoding on received spacecraft data at rates up to 512 kbps.	233092
3.2.6.3.	ETS shall provide the capability to receive CADUs at a rate up to 512 kbps.	233093

3.2.6.4.   ETS shall provide the capability to construct packets from received   233094
             low-rate return-link data and to transmit the data in the form of EDUs
             to the EOC at rates up to 512 kbps.

3.2.6.5.   ETS shall provide the capability to extract CLCWs from received low-   233095
             rate return-link data and to transmit the data in the form of EDUs to the
             EOC at rates up to 1 kbps.

3.2.6.6.   ETS shall provide the capability to receive commands from the EOC   233096
             and transmit as command bit streams at a rate up to 10 kbps.

Glossary

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accounting data: Information that describes in terms of volumes and quality the processing, inputs, and outputs of an ETS testing session. Accounting data comprises mission data identifiers, including time references; processing identifiers; and data quality and quantity information obtained and calculated.

availability: The probability that a given piece of equipment, function, or system as a whole is ready for operational use at the time it is needed. It is calculated as the ratio of uptime for the element, divided by the sum of its uptime and its downtime. Downtime includes time allotted for corrective maintenance (i.e., removing and replacing the failed item), preventive maintenance (i.e., deferred and scheduled maintenance activities), and administrative and logistic delay time. $A = MTTF/(MTTF + MTTR)$

CCSDS services: Data packaging and transmission services described in the CCSDS Recommendations for Space Data Systems Standards, as specified in CCSDS, CCSDS 701.0-B-2, Recommendation for Space Data System Standards; Advanced Orbiting Systems (AOS), Networks and Data Links: Architectural Specification, Blue Book, November 1992.

construction record: Data indicating the contents and quality of the associated PDS or EDS.

CH01

dynamic data: Data patterns that change as a predictable and repeatable response to some received input.

EDOS data unit (EDU):   A variable-length, delimited data unit whose structure and header information are specified by EDOS. The EDU consists of a service data unit concatenated with an EDOS service header.

electronic media: Data transfer media such as communications networks, e-mail, or data lines, in contrast to physical media (hardcopy computer printout, removable disk, magnetic tape, and so forth).

expedited data processing: Processing performed on return-link CCSDS packet data from a single TSS. This processing includes the following functions:

- Sorting packets by SCID and APID or by SCID, APID, and secondary header quicklook flag

- Forwarding time order packets

- Identifying data gaps

- Producing summary quality and accounting information

- Creating an EDS from the resulting packets

NOTE: As part of expedited processing, these data do not receive routine production data processing services, such as data merging, and redundant packet deletion. All these packets are retained for production data processing.

expedited data set (EDS):	The output of expedited data processing. An EDS construction record is associated with the EDS. An EDS is delivered to the DAAC within 1 hour of completion of the TSS.
forward-link data:	Data originating on the ground and passing through EDOS for transmission to a spacecraft.
frame synchronization:	A digital data handling procedure performed by a system that recognizes a fixed data pattern to determine the boundaries of a frame of data.
gap:	A condition of the test data in which there is a period of time when it appears that no data is being transferred. Three types of data gap are identified for ETS simulation: a clock signal is present on the transmission line, but no data is being transmitted; neither clock nor data is present on the line; and the clock signal is present, but there are no data transitions.

CH01

high-rate data:	For ETS purposes, data at rates greater than or equal to 1.1 Mbps.
level-zero data:	Spacecraft or instrument data at full space-time resolution with space-to-ground communications artifacts removed.
line-replaceable unit (LRU):	The lowest hardware unit defined by the design as replaceable during in-situ system maintenance.
log (verb):	To store received or generated data for the purpose of history accounting, fault isolation, or system recovery.
low-rate data:	For ETS purposes, data at rates less than 1.1 Mbps.
mean time between failures (MTBF)	The expected amount of operating time between two successive failures.
mean time to failure (MTTF)	The expected amount of operating time between two successive failures, excluding downtime. MTTF = MTBF - MTR.
mean time to repair (MTTR)	The expected amount of operating and non-operating time needed to perform corrective maintenance of an item.
mean time to restore (MTR)	The expected amount of operating time needed to restore a system from a failed state to a nonfailed state.

mission data:	Spacecraft, instrument, and other data for a specific mission. Mission data includes spacecraft forward- and return-link data in raw and processed forms.
online:	Data retrievable almost immediately on request from local storage media (e.g., disk farm), as contrasted to archived data, which usually requires substantial retrieval time for access.
operating time	The period the system is expected to be actively performing its intended functions.
operations management:	The supervisory, control, and support activities needed to sustain operations at an acceptable level. For EDOS, this includes system processing control, operations and maintenance, testing, training, operations planning, security, sustaining engineering, library services, and MO&DSD service integration management.
operations management data (OMD):	A generic term to describe any data used to manage EDOS operations and its interfaces. Examples of OMD include control, reporting, service request, and operations planning data.
physical channel:	A space/ground transmission medium.
physical media:	Removable disk, magnetic tape, or actual hardcopy (such as a computer printout or a screen dump onto paper), as opposed to electronic media such as communications networks, e-mail, computer memory, or online disk storage.
playback data:	Data that is identified as having been recorded onboard a spacecraft for later transmission to the ground.
playback processing:	The processing performed on return-link data to remove communications artifacts that result from spacecraft onboard recording and the subsequent playback of mission data. Depending on the type of tape-recording system used onboard the spacecraft, the playback processing may include the detection and forward bit-ordering of bit-reversed CADUs, and reverse ordering of a sequence of VCDUs from the order in which the VCDUs were originally received by EDOS. Playback processing restores the as-recorded order to spacecraft tape-recorded data received by the frame synchronization function in reverse order. Playback data received in forward order are processed and stored as received.
predefined:	Known and planned for. In the case of ETS, the types of errors introduced into the data are known and user chosen; they are not random, unpredictable, or unexpected.

production data processing:	Processing performed on return-link CCSDS packet data, which includes the following functions:

- Sort packets by SCID and APID

- Forward time-order packets

- Identify data gaps

- Produce summary quality and accounting information

- Create a PDS containing merged data from multiple Tracking and Data Relay Satellite (TDRS) service sessions (TSSs)

- Identify and delete redundant packets between multiple TSSs

production data set (PDS):	A PDS consists of CCSDS packets from a single SCID/APID and a PDS construction record. A PDS is generated during production data processing.
quality and accounting data:	Data that describes the results of EDOS mission data archive and data delivery services. Quality and accounting data includes mission data identifiers such as time references, EDOS processing identifiers, and the mission data quality and quantity information obtained from the EDOS processing.
rate-buffered data:	Mission return-link data that has been received by the EDOS from a single TSS for delivery at a rate different from the rate received.
real-time processing:	Real-time processing as defined by EDOS describes processing performed on mission data with minimized latency through EDOS.
reliability:	The probability that a system, a comprised element, or a given piece of equipment will operate within design parameters under stated conditions, for a specified interval.
return-link data:	Mission data originating on a spacecraft for transmission to the ground.
service access point:	The point at which services are provided by an entity to a user of the entity. Service access points can be internal or external to EDOS.
service data unit:	Any of the CCSDS standard data units associated with CCSDS standard services, including the following: CVCDU/VCDU, CCSDS Version 1 packet, ISO 8473 packet, bit stream, fixed length data unit, isochronous octets, link access control word, Version 1 transfer frame, telecommand transfer frame, CLCW, and CLTU.
service request:	A request message from a customer for a change in the EDOS services being provided to that customer.
space network (SN):	The combined space and ground segment elements supporting the TDRSS. The SN includes the TDRSs, the White Sands Complex, and the Network Control Center for TDRS scheduling and control.

source: A ground service access point from which data is received.

static data: Data that follows a fixed, predictable pattern over time.

status data: Status data defines the characteristics of current system operations. Status data comprises configuration, performance, fault, data accounting, and security information.

test (verb): To monitor an element's output and apply acceptance criteria against it.

test data: Data used for testing and/or diagnostics.

test data set: A data set comprising a test data set identifier, test data used, expected test results, and accounting data.

test report: A report that documents the results of an ETS testing session.

test request message: An OMD message to identify a specific planned test operation and to request resources and support for the test.

test results: The evaluation of the testing performed. Test results include detailed specifics of detected errors as well as summary totals and various calculated measurements.

testing session: ETS testing operations are organized into three phases: pretest preparation, real-time testing, and post test analysis. The term *ETS testing session* refers collectively to all three phases, when executed in a contiguous block of time.

user data: Test data provided to ETS by an ETS-external source.

verification: The process of confirming by test or comparison to other operating systems that a configuration item or configuration item component can achieve its objectives.

virtual channels: A CCSDS architectural concept whereby a single physical channel may be shared by different users by creating multiple, apparently parallel "virtual" paths through the physical channel. This is formally described in the reference cited under "CCSDS services."

virtual channel data unit (VCDU): A fixed-length CCSDS Advanced Orbiting Systems data structure used bidirectionally for space/space or space/ground communications. A VCDU that includes forward error correction coding is referred to as a coded VCDU (CVCDU) and is implied by references to VCDUs, as specified in the reference cited under "CCSDS services."

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Abbreviations and Acronyms

AM-1	morning equatorial crossing spacecraft - 1	
AGS	Alaska Ground Station	CH01
APID	application process identifier	
BER	bit error rate	
bps	bits per second	
CADU	channel access data unit	
CCSDS	Consultative Committee for Space Data Systems	
CLCW	command link control word	
CLTU	command link transmission unit	
COP	Command Operation Procedures	
CVCDU	coded virtual channel data unit	
DAAC	Distributed Active Archive Center	
		CH01
EBnet	EOSDIS Backbone Network	
EDOS	EOS Data and Operations System	
EDS	expedited data set	
EDU	EDOS data unit	
EOC	EOS Operations Center	
EOS	Earth Observing System	
EOSDIS	EOS Data and Information System	
ESDIS	Earth Science Data and Information System	
ETS	EOSDIS Test System	
F&PR	functional and performance requirements	
GB	gigabyte	
		CH01
GOSIP	Government Open Systems Interconnection Profile	
GSFC	Goddard Space Flight Center	
IP	Internet Protocol	

IRD	interface requirements document
ISO	International Standards Organization
IV&V	independent verification and validation
kbps	kilobits (thousands of bits) per second
LRU	line-replaceable unit
Mbps	megabits (millions of bits) per second
MO&DSD	Mission Operations and Data Systems Directorate
MTBF	mean time between failures
MTTF	mean time to failure
MTR	mean time to restore
MTTR	mean time to repair
NASA	National Aeronautics and Space Administration
Nascom	NASA Communications
OMD	operations management data
OSI	Open Systems Interconnection
PDS	production data set
PDU	protocol data unit
PM	afternoon equatorial crossing (series of spacecraft)
RLPF	return-link processing function
SCID	spacecraft identifier
SCITF	Spacecraft Integration and Test Facility
SCS I&T	spacecraft checkout system integration and test
SGS	Svalbard Ground Station (Norway)
SN	Space Network
SRR	system requirements review
SSIM	EOS AM-1 spacecraft simulator
TBD	to be determined
TBR	to be resolved
TDRS	Tracking and Data Relay Satellite
TDRSS	Tracking and Data Relay Satellite System

CH01

TGT	TDRSS Ground Terminal
TSS	TDRS service session
UTC	universal time coordinated
VCDU	virtual channel data unit
VCDU-ID	virtual channel identifier
WOTS	Wallops Orbital Tracking Station

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